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The Botulinic Syndrome in Milk Fever.

(A PRELIMINARY NOTE.)

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In 1897 Van Ermengem described the botulinic syndrome, and in 1918 Dickson covered much the same experimental field and reached similar conclusions. Both agreed that the symptoms were those of "bulbar paralysis," an opinion that perhaps needs modification if it is to be understood to cover the whole of the symptoms.

Since Van Ermengem's paper appeared the botulinic syndrome has been the subject of a great number of articles both in medical and veterinary literature, and many conditions have been described in which the syndrome has been more or less completely reproduced, for example, Lamziekte (Theiler), Parabotulism in cattle (Seddon), Grass Sickness (Tocher), etc. Experimental administration of botulinus toxin has also been undertaken by various workers, and the original features described by Van Ermengem as characteristic are generally accepted.

But so far as the writer is aware, few at the present time appear to realise that the "botulinic" syndrome is present in "milk fever."

We are indebted to a paper by H. R. Seddon for a recapitulation of the seven characteristic points of Van Ermengem, and will now proceed to discuss how far these are present in milk fever. They are:—

1. *An arrest of secretion or a hyper-secretion of the saliva and of the bucco-pharyngeal mucosa.*

That salivation is an almost invariable feature of milk fever will not be disputed. It is probable that the accumulation of saliva depends more on inability to swallow (paralysis of pharanx) than on any definite hyper-secretion.

2. *By a more or less complete external or internal ophthalmoplegia (blepharoptosis, mydriasis, paralysis of accommodation, diplopia, internal strabismus).*

It is particularly noted in milk fever that the pupil is dilated and that there is evidence of greatly impaired vision. Such symptoms as diplopia cannot be detected in cattle. Ptosis is of frequent occurrence.

3. *By dysphagia, aphonia, persistent constipation, retention of urine.*

Dysphagia is usual in milk fever and it is quite likely that aphonia is present, but it is obviously difficult to detect. Constipation and definite cessation of peristaltic movements (as determined by auscultation) have long been recognised as valuable signs. Retention of urine is an almost invariable accompaniment.

4. *By a general weakness of the contractibility of all the voluntary muscles.*

This is very characteristic and is probably in the nature of a general loss of tonus rather than a definite paralysis. In milk fever the animal is unable to bear its own weight, and even when down seeks to rest its head either on one flank or straight out on the ground. In the early stages inco-ordination of movement is very apparent and clonic spasms are also seen. These are not mentioned by Van Ermengem, but have been described in lamziekte, forage-poisoning and other "botulinic" diseases.

5. *By the absence of a febrile state, and of disturbances of general sensation and intelligence.*

The temperature is sub-normal, or no more than normal in established cases.

The quick onset of coma in so many cases of milk fever masks the reaction on which one would have to rely for any suggestion of loss of sensation and intelligence. However, cases occur in which the coma disappears after Schmidt's treatment, but definite bulbar paralysis remains, and in these cases full sensation and intelligence are retained up to the time of death.

6. *To the whole of these phenomena are often added respiratory and circulatory disorders which end in a more or less rapid death by bulbar paralysis.*

In milk fever the respiration is invariably slowed and in the late stages may be stertorous from paralysis of the soft palate. The pulse is invariably rapid, but is soft and of poor quality. The body temperature falls, coma supervenes, and death follows from failure of those activities which depend upon the bulbar nerve centres.

In the typical "botulinic" syndrome, the respiration is invariably slowed and the pulse rate is invariably increased. Coma is not typical of this syndrome, but it is suggested that the underlying factors concerned in the production of milk fever are possibly responsible for this change. It is worthy of note, however, that coma occurred in Seddon's artificially produced parabotulism in cattle.

7. *Finally, the characteristic manifestations do not supervene at the soonest for twelve to twenty-four hours after the ingestion of the foodstuff. These are often preceded by transitory gastro-intestinal disturbances, appear gradually and persist for some weeks.*

Since the cause of milk fever is not known we cannot speak of a definite incubation period, but it

is significant that it generally occurs at a more or less constant interval of about forty-eight hours after parturition. The gastro-intestinal inflammation found *post-mortem* in those acute cases that die in spite of treatment is a constant feature and may be much more severe than the description of Van Ermengem would suggest.

Thus, if we take only the syndrome of Van Ermengem, it is apparent that milk fever is a disorder of distinctly "botulinic" type. But we can enlarge this syndrome somewhat by a comparison of milk fever with certain already admitted "botulinic" diseases.

It is a peculiar feature of lamziekte that it chiefly affects cattle in good condition (Theiler, Spruell, Robertson), is most severe in females and occurs with a markedly increased frequency about the time of parturition (Robertson, Spruell, Theiler). This is equally true of milk fever, which is, moreover, more prevalent in breeds with a high fat content in the milk. It is noteworthy also that the parabotulism of Australian cattle is chiefly seen in dairy cows (Seddon).

All three diseases tend to be of restricted distribution, yet assume the form of localised epidemics, and all three vary in type between the hyper-acute and the more or less chronic.

It is probable that the hyper-acute type may be represented by those rapidly fatal cases of so-called "stomach staggers."

A stage of excitement has been noted in a percentage of cases by Theiler, Spruell, Robertson, Graham and Schwartz, and also seems to be fairly characteristic of experimental botulism. An early excitement phase in milk fever is not infrequently observed.

It will serve no useful purpose to prolong this preliminary note by more detailed comparisons, for to those acquainted with milk fever and with the botulinus syndrome the resemblance has only to be suggested to be at once appreciated. But some suggestion ought perhaps to be hazarded as to why cows shortly after calving should fall victims to the toxins of some members of the botulinus group.

There are good reasons for supposing that cattle (at least in this country) ordinarily pick up or even harbour bacteria of the botulinus group, but that these are generally innocuous, either from an inability to elaborate poisons or from the counteracting of the toxins as soon as formed.

We know that the botulinus toxins are exotoxins, and that in the case of lamziekte they are best elaborated when particular forms of pabulum are available. Beyond the fact that there are profound metabolic changes attendant on parturition and establishment of the milk flow, we know little about the possibilities in this direction presented by milk fever. It is reasonable, however, to suppose that there is a deficiency of calcium and phosphorus, for we know from the records of osteomalacia how heavy a drain is made on these in pregnancy. It has been found that calcium and phosphorus feeding (*e.g.*, bone meal) greatly reduces the incidence of lamziekte, and it is possible that this factor is in some way common to both diseases.

It is, however, impossible at present to do more than theorise, and theory on such debatable subjects is perhaps undesirable. But that milk fever must now be added to the growing list of disorders referable to some organisms allied to the *B. botulinus* seems established, and it remains for those who have opportunity for laboratory work to carry out such investigations as may be required.

BIBLIOGRAPHY.

1. DICKSON, Monograph of Rockefeller Institute for Medical Research, No. 8, 1918.
2. THEILER (A.), VIJOEN (P. R.), DU TOIT (P. J.), and MEIR (A.), "Cause and Prevention of Lamziekte," *Journ. of Dept. of Agriculture of South Africa*, 1920.
3. SEDDON, H. R., *Journ. Comp. Path. and Therap.*, Vol. XXXV., "Bulbar Paralysis in Cattle due to the action of a Toxicogenic Bacillus, etc."
4. TOCHER, J. P. and J. W., Highland and Agricultural Society of Scotland, "Memo. on Identity of Grass Sickness and Botulism."
5. SPRUELL, J., *Journ. Comp. Path. and Therap.*, Vol. XXI., p. 193, "Lamziekte."
6. ROBERTSON, WM., *Journ. Comp. Path. and Therap.*, Vol. XXIII., p. 229.
7. GRAHAM AND SCHWARZ, *Journ. Bact.*, Vol. VI., 1921.

Foot-and-Mouth Disease.

The returns of premises found to be newly infected by foot-and-mouth disease during the week ended 30th March were lighter than any weekly returns since the outbreak began increasing in force during November last. The number is 36, which compares with 39 of the previous week, 57 the week before, and 62 during the first week in March. The average for the month of March, therefore, is 48 new outbreaks per week, as against 74 per week in the month of February. These figures are to be compared with 320 cases per week when the outbreak was at its height in the last week of 1923.

The Ministry of Agriculture has issued a new Order which will come into operation on the 15th April, 1924, strengthening the provisions of the Regulations respecting the cleansing and disinfection of railway trucks used for the carriage of animals in Great Britain, and of railway pens and loading docks used for the temporary detention of animals in transit by rail. The new Regulations will also apply to vessels carrying animals to this country from Ireland, the Channel Islands and the Isle of Man.

The use of limewash as required under the existing Regulations has not proved satisfactory in practice as a disinfectant. The main alteration effected by the new Order is the substitution for limewash of a disinfectant which is to be either—

(*a*) A one per cent. (minimum) solution of chloride of lime, containing not less than 30 per cent. of available chloride; or

(*b*) A four per cent. (minimum) solution of carbolic acid containing not less than 95 per cent. of actual carbolic acid; or

(*c*) A disinfectant equal in disinfective efficiency to the above-mentioned solution of carbolic acid.

Such disinfectant is to be applied to railway trucks, pens, loading docks, vessels, etc., as they stand, after the removal of the animals and before the removal of any dung, manure, or litter therefrom. This is to be followed by a thorough scraping and sweeping of the truck, pen, etc., and the removal of the contents, then by a thorough washing and scrubbing with water, and finally by a second application of the prescribed disinfectant. The dung, manure, litter, etc., removed from the truck is required to be forthwith mixed with quicklime and removed from contact with animals, or effectually burned.

Equine Piroplasmosis, Nuttalliosis or Biliary Fever, as it occurs in India.

By Captain G. F. Steevenson, Royal Army Veterinary Corps.

Nature of the Disease. Biliary Fever is a specific disease principally affecting horses, but also attacking donkeys and mules, due to the invasion of the red blood corpuscles by a protozoal organism, of which there are now known to be two varieties or species. It is characterised by a remittent fever and symptoms of depression, severe jaundice and occasionally hæmoglobinuria, due to hæmolysis. It may only attack individual horses, or sometimes it appears as an epizootic, especially where there is a number of susceptible animals.

Seasonal Prevalence. The disease is commonest in India during the hot weather months and the south-west monsoon rains. It occurs occasionally at other times, but not to any great extent. Imported horses are most susceptible, and it is commonest in Australian or English horses. Country breds are apparently comparatively immune, though they probably act as "carriers" of the disease. Donkeys and mules appear to possess a considerable degree of immunity, but this may be accounted for by the fact that in India they are nearly all country bred.

Cause of the Disease. Before the discovery of the causal parasite, "Biliary Fever" in equines was looked upon as a dietetic or climatic disease, due to derangement of the liver and autotoxæmia from the absorption of the products of deranged digestion and metabolism, but it is now known to be due to an intra-corpuscular parasite which seems to have been first observed by Gugliemi in Italy, 1899, and in 1901 by Laveran, who studied stained blood films sent to him by Theiler from cases of the disease in South Africa. Laveran placed the parasite in the genus Piroplasmata, but since then Gugliemi, in 1903, pointed out that the term piroplasma was inaccurate, and it has been discovered that two distinct parasites are concerned in the disease. This was first pointed out by Koch in 1905, and his observations were continued by Franca, who placed the parasite oftenest met with in a new genus and named it *Nuttallia equi*. The second variety of parasite, which appears to be much less common in India (and this was also the case in Macedonia, according to the observations of German workers during the war), is now named *Piroplasma* (*Babesia*) *Caballi*, and the conditions produced by this parasite may be regarded as a distinct and separate disease. The reasons for placing *N. equi* in a separate genus are fully described in an article on the subject by Professor G. H. F. Nuttall, F.R.S., of Cambridge, and Professor C. Strickland, M.A., B.C., in *Parasitology*, Vol. 15, No. 1, February, 1912, the principal one being that this parasite does not multiply and reproduce itself by the method invariably adopted by the other well-known piroplasms, e.g., *P. canis*, *P. bigeminum* and *P. parvum*, viz., by "budding," which results in each parasite becoming two piriform parasites, but by a process peculiar to itself, which will be described under the heading of "Reproduction of the Parasite."

Nature of the Parasite. As already stated, *Nuttallia equi* has been placed in a genus by itself (up to the present) on account of its characteristic method of multiplication. A very detailed study of the parasite is given in the above quoted article by Professor Nuttall and Professor Strickland, who examined blood preparations, both fresh and stained. These studies showed that the parasite was an amœboid protozoal organism, which in both fresh and stained preparations showed a very great variety of shape and form. The parasite measures about 1—2 microns in diameter, and stained specimens show a distinct protoplasm stained blue and a more or less distinct nuclear (chromatin) structure, which stains red when Giemsa's or Leishmann's stain is used. The blue cytoplasm may be uniform in density or condensed towards the periphery of the parasite, and may occasionally appear vacuolated. The parasite is actively amœbiod, as was conclusively shown in the observationsof Professors Nuttall and Strickland, already referred to, and the large variety of shapes met with in stained specimens probably depends on the shape of the parasite at the moment of its death, and also on the stage at which it is in the process of multiplication. Before describing the stained parasite it may be convenient to give a description of its mode of reproduction as worked out and described by Professor Nuttall, and as seen in the films examined in India. Some of these reproduction forms are those oftenest met with. This is well shown in the description and diagrams given in the paper on the subject written by Major (now Lt.-Col.) A. J. Williams, D.S.O., R.A.V.C., on cases occurring at Secunderabad, Deccan, in 1912 and 1913. In many slides which I have examined myself, mainly at Secunderabad and at Neemuch, I have also found certain of these forms to be the commonest met with.

Reproduction of the Parasite. This appears to be a far more complicated process than that adopted by the well-known piroplasms, and the great variety of shapes of the parasite met with is also widely different from these.

Professor Nuttall considers that the parasite multiplies slowly and in the manner here described, and I do not think that I can do better than quote from his article and reproduce the diagram which he published:

> "(1) The minute piriform or oat-shaped parasite enters a fresh corpuscle and (Diagram 2, 3, 4, 5) grows in size, being slightly amœboid, with a general tendency to resume a pear shape. Definitely amœboid movements (6) are, however, only to be seen distinctly when the parasite has attained a certain size. Judging from the form of the chromatin masses, stages 7, 8, 9, 10 follow next. The rest of the cycle has been continuously observed in the living parasite; the formation and the breaking up of the cross-forms, the scattering of the daughter cells within the corpuscles, and their escape from the corpuscle which usually does not appear to be injured in the process."

DEMONSTRATION OF THE PARASITE AND METHODS OF STAINING. To prepare good blood films for examination it is essential that the films should be thin, evenly spread, and the slide absolutely free from grease or any kind of dirt. It is best to use slides that have been cleaned in ether and then kept in spirit. The small patch of skin should be shaved over a vein (I have found the angular vein on the face just below the orbit a convenient one to use), and the vein then punctured with a sterilized exploring needle, or other sharp instrument of about the same size. A mere drop of the blood should then be touched on the end of a clean slide which is then held on to another slide, and the drop allowed to run across the width of the slide. The first slide is then drawn with an even motion across the underneath one, in the ordinary method of making a blood film. It is essential that only a small drop of blood be taken or the film will be thick and uneven. The film is then left a few moments to dry in the air, protected of course from dust.

The commonest stains used are the modifications of Romanowsky, either Giemsa or Leishmann's stain acts well, and I have also used the Eosin-Methylene Blue method of Louis Jenner. These stains are self-fixing, or rather the alcohol in the stain acts as a fixing agent, so that no other fixing operation is necessary before staining, except in staining by Giemsa, in which the smears should be fixed in alcohol. After the staining is complete the stain is washed off with distilled or rain water, and the slide is again air dried. It can be examined with or without mounting. If mounted, a special balsam should be used, as the ordinary balsam is slightly acid and soon decolourises the specimens.

EXAMINATION OF THE SLIDES. The parasites are seldom numerous, and are very often difficult or impossible to find in what are clinically typical cases of the disease. In the experimental cases inoculated by Professor Nuttall the percentage of infected red blood corpuscles is given as 5·4 per cent.; 13·2 per cent.; and 6·6 per cent. in three cases. I have only once or twice met with anything like the highest figure, but in one case in Meemuch, in July, 1921, there were four infected corpuscles in one field of the microscope, and in many parts of the same slide two or three in one field. This, however, is quite exceptional. I should say one per cent., or two per cent., is much more common, and often one may find only four or five parasites in a whole film, and, as already stated, they are often not demonstrable at all. They appear to be most numerous when the temperature is high and least so or absent during the remissions.

The slides are examined with $\frac{1}{12}$ inch oil immersion lens, and a No. 2 eyepiece (Leitz microscope), and when found can then be examined with a No. 4 eyepiece. The No. 2 eyepiece, which gives a larger field of observation, is sufficient to show the presence of an intra-corpuscular organism, and the higher power can then be used to study the organism when found. Great care has to be exercised to make certain that one is not mistaking a piece of debris or stain lying adjacent to or above or beneath the corpuscle for a parasite. The best test for ascertaining that the object under observation is actually *intra*-corpuscular is to slowly and carefully alter the focus with the fine adjustment of the microscope, when it will be found that an intra-corpuscular body, such as a parasite, will be found in focus *with* the corpuscle itself, whereas an *extra*-corpuscular object, above or below the corpuscle, would be sharply in focus when the corpuscle itself is more or less out of focus, and therefore blurred in outline.

The parasites stain in a manner similar to the common piroplasms, viz.: the cytoplasm blue and the chromatin red, as already stated under the heading "Nature of the parasite." In my own experience the forms most commonly met with are as follows:—(1) A signet ring form in which the cytoplasm is condensed on one side of the periphery and corresponding to No. 7 in the reproduction cycle (see diagram). (2) A form corresponding to No. 8 in the

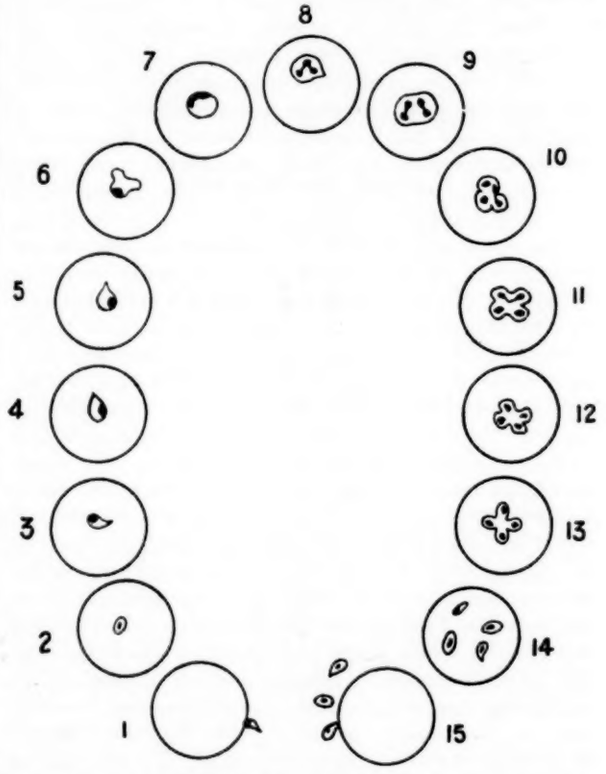

DIAGRAM TO SHOW METHOD OF MULTIPLICATION OF NUTTALLIA EQUI IN THE CIRCULATING BLOOD.

cycle, viz.: the cytoplasm condensed in the form of a V with the chromatin at the ends of the V. (3) A form corresponding to No. 9 in the cycle with the ends of the V commencing to separate. (4) The cross form (No. 13 on the cycle), but I have only observed this occasionally, probably because it occurs a little later on in the disease, and does not often appear after treatment. (5) The common pear-shape is fairly common, as is also a comma-shaped form in which the chromatin appears at the blunt end of the comma,

thus ⌣. Various other forms are also encountered, probably depending, as already stated, on the actively amœboid nature of the parasite and the state it is in at the moment of death. In a paper written by Kuth, Behn, and Schulze, three German workers in Macedonia in 1917, it is stated that the first forms met with in the disease were the rounded or pear-shaped forms occurring singly in the corpuscles. Maltese Cross forms appear generally after two days. Small rounded, comma-shaped, and pear-shaped forms occurring in twos, threes and fours, in a corpuscle were also noticed by these workers. I have personally, only on a few occasions, seen more than one parasite in a corpuscle, but in the case referred to as occurring at Neemuch, in July, 1921, I saw one corpuscle containing three parasites, and two or three containing two. I cannot lay too much stress on the point that in many cases a patient search has to be made in order to discover parasites at all, and that in many cases, in fact, probably in the majority of what appear to be typical clinical cases, no parasite can be seen at all.

It is in order to overcome this difficulty that other special methods have been devised to demonstrate the parasite where it is scanty and difficult to discover. The first of these is a method devised by Baldry Mitchell, and is based on the fact that when an animal cell is digested or contains a parasite capable of digesting it, "neutral red" added in a 1 per cent. solution reacts to the acid production of digestion taking place in the cell and colours the contained parasite red. By this method the blood may be examined and the living parasite observed *in vitro*, stained a red colour. To do this infected blood is mixed in a Wright's pipette with 1 per cent. of neutral red in potassium citrate solution. This is incubated for fifteen minutes at about 100° F., and examined in a "hanging drop" preparation. The potassium citrate is 2·5 per cent. The solution is made according to the following formula:—

Potassium citrate	...	...	grs. xii.
Aqua ad	...	...	ozs. i.
Neutral red	...	...	grs. iv½.

Another method more readily available to the ordinary worker is the following, which is described in *Notes on the thick film method of staining piroplasms and anaplasms in routine veterinary diagnosis*, by A. Goodall, M.R.C.V.S., Dept. of Agriculture, Union of S. Africa, *vide Journal of Comparative Pathology and Therapeutics*, Vol. 33, June, 1920, and is as follows:—

A fairly large drop of blood is allowed to fall on the centre of the clean slide, spread out to the size of a threepenny piece or sixpence with the corner of another slide, and allowed to dry at room temperature, protected from dust. An endeavour should be made to make the film a uniform thickness, and not too thick, as otherwise coagulation will distort the blood elements. For field work the films can be conveniently prepared and taken in an ordinary slide carton to the place where they are to be examined. No fixation is necessary prior to staining. The films are plunged into a bath of the following solution, in which they are allowed to remain for thirty minutes: 2 c.c. of a 1 per cent. watery solution of eosin; 4 c.c. of a 1 per cent. solution of azur ii, and 220 c.c. of distilled water. This solution should be made up fresh every day. The slides should be numbered with a diamond. After staining the films are washed with distilled water and allowed to dry at room temperature. During the process of staining the hæmoglobin is dissolved out, and if the parasites are present, one gets a field of them, which, together with leucocytes and a varying quantity of debris, is practically all that is seen. The chromatin and the plasma elements of the parasite are said to come out very distinctly, with practically the same colouring as is obtained when they are stained intracellularly by Giemsa's method, but with the great advantage that one generally obtains a field of several parasites in various stages, which can be studied together without shifting the field. The method appears to have been used by the author with great advantage in the diagnosis of bovine piroplasmosis, anaplasmosis, East Coast fever and anthrax. It was suggested to him by Gibbs (C.F.), Assistant Bacteriologist to the Public Health Department (Union of South Africa), who employed it in the routine diagnosis of malaria in the human subject.

I have not been personally able to obtain the azur ii in India to carry out this method, though I have tried to do so on several occasions.

Effects of the Parasites upon the Blood. The changes produced in the blood are profound, and consist mainly in hæmolysis and complete destruction of a large number of red corpuscles, with consequent anæmia, and the usual symptoms of blood destruction, jaundice, etc., are produced. In the experimental cases described by Professor Nuttall, the erythrocytes fell from nine millions to three millions by the nineteenth day, and in the observations recorded by the above-mentioned German workers in Macedonia, they fell from eight millions per c.mm. to less than two millions.

A method of estimating the degree of corpuscular destruction was used by Behn, in Macedonia, in 1917, and is described in their report on investigations into equine piroplasmosis. It has the advantage of simplicity, and the apparatus could easily be carried and used on active service. Only two graduated tubes of about 15 c.c. capacity, a test tube, and 5 per cent. solution of sodium citrate are required. (See diagram)

The method is as follows:—Enough blood to fill a test tube is withdrawn from the jugular vein by means of a hollow needle and poured into a graduated tube, which is fitted with a stopper. About 2 c.c. of 5 per cent. of sodium citrate solution is then added; the stopper is placed in the tube, and the tube shaken. The next day read off the height of the layer of corpuscles and multiply this number by two (an average number obtained by comparative calculations). Thus, if the height of the column is 3·8 c·cm., then the number of corpuscles in the cubic mm. is 3.8 multiplied by two, equals 7·6 millions per c.mm. This

number is, of course, only approximate, and varies with the actual size of the red corpuscles, which, according to the authors of the report, varies a good deal with the individual. It does, however, give a ready comparative idea of the degree of hæmolysis. A reference to the attached sketch will help to explain this. With a little practice the blood can be drawn into the graduated tube direct. It would appear much better to pour the 2 c.c. of sodium citrate into the tube before adding the blood, as coagulation could then be prevented easily by agitating the tube as the blood flowed in.

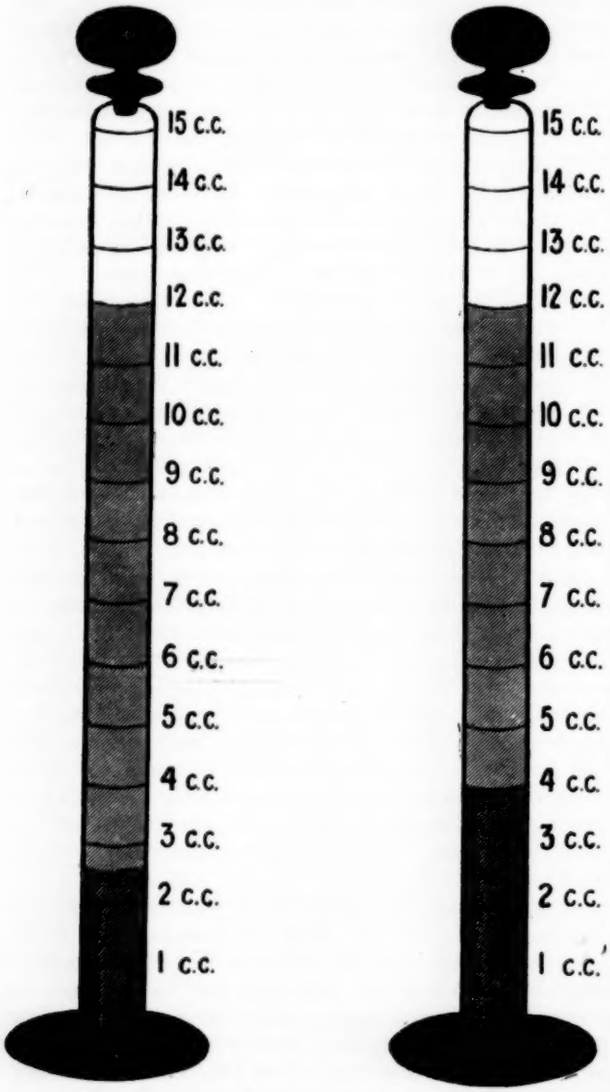

Diagram to illustrate the method of KNUTH, BEHN, and SCHULZE, for estimating the degree of hæmoglobin in Equine Piroplasmosis.

The column of corpuscles is smaller than normal according to the amount of destruction of erythrocytes that has taken place, and the supernatant serum is reddish brown in colour as opposed to the normal amber tint. See text on Page 9. The graduated tube is filled with freshly drawn blood up to the 10 c.c. mark and 2 c.c. of 5 per cent. Sodium Citrate solution immediately added to prevent coagulation. The manipulations must be done quickly.

In the left-hand tube, the number of red corpuscles is $2{\cdot}5 \times 2 = 5$ millions per c.m.m. In the right-hand (normal) tube the number is $4 \times 2 = 8$ millions per c.m.m.

Knuth, Behn, and Schulze also noticed the abnormal corpuscles which appear in profound anæmia such as poikilocytes anisocytes, and nucleated red corpuscles. In these cases the percentage of corpuscles infected was very high.

Professor Nuttall's observations show that the parasites can, and do, escape from the corpuscles without rupturing them, but while under observation *in vitro*, numerous corpuscles burst or "vanished," leaving the contained parasites motionless.

DISTRIBUTION OF THE PARASITES. In horses dead of the disease, blood taken from the various organs, immediately after death, does not show any marked variation in the percentage of the corpuscles infected. Numerous parasites were observed free in the blood plasma in blood examined by different observers, but in my own experience I have not met with them, or if I have, have failed to recognise them.

METHODS OF INFECTION AND TRANSMITTING AGENTS. It appears more than probable that in India, at any rate, the disease is spread, at least partly, mechanically by biting flies, and possibly other blood-sucking parasites. The disease is transmissible from horse to horse by direct inoculation of blood or citrated blood, and it is not necessary for the organism to undergo any metamorphosis in a tick or other host for it to be able to continue propagating when it enters a new equine host. There, therefore, appears to be no reason against its being transmitted mechanically by biting flies such as Tabanidæ, Stomoxys, Calcitrans, Hæmatopota, etc., if such a fly feeds on an infected case or "carrier," and then proceeds to a "clean" horse. On the other hand, many observers consider that this *is* at least one of the principal means by which the disease is propagated. Certainly in India the incidence of the disease is greatest at those seasons when flies are most prevalent, and it is often epizootic when very few or practically no ticks can be found on horses and these are carefully looked for, and removed when found before they have time to feed to any extent. That the disease can be, and is, transmissible by infection, through ticks, is undoubted, and in Europe this appears from literature on the subject to be the usual method by which the disease is spread. The German workers already referred to investigated many varieties of ticks in Macedonia, but only found three varieties on horses infected with Nuttalliosis, viz., *Rhipicephalus bursa*, *R. sanguineus* and *Hyalomma ægyptium*, and it was not considered probable that the latter acted as a carrier of the disease. On the other hand, they considered that *R. bursa* and *R. sanguineus* might either, or both, be incriminated, especially as a closely related tick, *R. evertsi*, had been proven to act as a transmitter of Nuttalliosis. Actual transmission experiments by these authors were never completed. In India the tick oftenest encountered is *H. ægyptium*, but it usually appears to come from cattle which are generally heavily infested with it. I have

met with this tick at Neemuch and Nasirabad, but it does not appear to be connected with the disease, and this agrees with the opinion of the above quoted German authors. The tick *Dermacentor reticulatus* has been held to transmit *Babesia caballi* in South Russia and the Balkan Peninsula, but I am uncertain as to whether the tick is found in India, and in my own experience the *N. equi* infection is commoner than *B. caballi*.

Carriers. Horses that have been infected with *N. equi* and recovered from the disease can, and do, undoubtedly act as "carriers" of the disease for a very considerable time, and possibly all their lives. This, no doubt, is responsible for the recurrence of the disease at definite seasons of the year, when the transmitting agents become available. This was again shown in the observations of Knuth, Behn, and Schulze, who for their experiments obtained a captured horse of Serbian origin and injected 10 c.c. of blood into a German horse intravenously. Seven days later *N. equi* appeared in the blood, and a few days later the cross forms were demonstrable. Infection in this case was mild, but the virulence increased rapidly by "passage," and at the sixth "passage" mortality was produced and the incubation period was reduced. By the eight "passage" incubation period was only two days. This was probably aided by the fact of the German horses being very susceptible.

There appears to be no doubt that in India there are numerous carriers of the disease, and very probably country bred horses which possess a comparatively high degree of immunity also act as carriers in many cases. Knuth, Behn, and Schulze state that foals infected early in life act as carriers all their lives, and they obtained their material for investigation in this way (i.e., by injecting blood from a captured Serbian horse into a susceptible German horse).

Symptoms of the Disease. Very often the first thing noticed is that, while at work, the horse becomes sluggish and unwilling to move, and when got back to the stable is found to be off his feed and depressed. This depression is a marked feature of biliary fever, and in severe cases weakness may be so marked that the animal will stagger and stumble when moved. The temperature is generally very high, often 106°, 107°, or even 108° F. The mucous membranes, particularly the conjunctiva, are jaundiced, even mahogany coloured, and show marked patechiæ: at first of a bright red colour and later enlarging and coalescing to form large blotches of a dark purple tint. The mucous membranes of the nose, mouth and vagina are also icteric, and may show petechiæ. The pulse is quick and thready at first, becoming weaker. The symptoms are accentuated by animals being exposed to the sun.

There is often œdema, especially of the legs, and cases have been observed where this occurred without any other marked symptoms, the diagnosis being made by the discovery of the parasite. (One case occurred in my own experience at Seehore Remount Depot, where there was marked œdema of all four legs and under the sternum, the temperature never rising much above 101°. Blood examination proved negative, but the case recovered when treated by quinine injections, and I think it highly probable that *Nuttallia equi* was the cause of the condition. The case did not relapse up to six weeks after treatment and had resisted the ordinary treatment by salines, purgatives, etc.)

The temperature is not continuous, but falls to normal, or nearly so, after four or five days, perhaps even below normal, and there is a recurrence after about the third day. Hæmoglobinuria is not common, but does occasionally occur in severe cases, and in these the subsequent anæmia is very marked. A few cases resist treatment, and in them fever is almost continuous; there is increasing emaciation, marked dyspnœa and increasing œdema of the legs, sheath, and under the sternum. Jaundice in such cases is very marked in all the visible mucous membranes, and on *post-mortem* examination there is intense staining of all the tissues and serous membranes; the latter also show petechial hæmorrhages and usually there is some straw-coloured fluid in the pericardium. The intestines also show marked icterus, and the heart muscle is pale and shows fatty degeneration. The blood is watery, and there are always the yellow, so-called ante-mortem clots in the larger vessels. Some cases of chronic debility are in all probability cases of Nuttalliosis, for although the parasite may not be demonstrable, such cases often improve rapidly in condition after an intravenous injection of quinine. I have also seen cases of paraplegia with weakness of the hind quarters, particularly one case in Secunderabad, in 1914, which improved after quinine injections. Weakness of the hind quarters is usually one of the symptoms of the disease, and apparently in a few otherwise recovered cases, which are probably carriers of the parasite.

Complications. These include congestion of the lungs and pneumonia, laminitis, and enteritis, but in treated cases complications are very uncommon, unless they have become advanced through not being discovered or treated in time.

Diagnosis. Early diagnosis is very important, both as regards prophylaxis and the necessity for early treatment. To one familiar with the disease it is fairly easy on the clinical symptoms, and, of course, finding the parasite makes it positive. A very useful additional method is to take 10 c.c. of blood in the graduated tube with 5 per cent. sodium citrate solution, as described under "Effects of the parasite on the blood." The degree of corpuscular destruction can be estimated, and if severe the supernatant serum will be tinged red.

Differential Diagnosis.

(1) *Equine Influenza.* Influenza is marked by its high contagiousness and rapid spread through a stable or unit; by the characteristic discolouration of the conjunctiva and swelling of the eyelids. The œdema in influenza appears more rapidly and more extensively, cardiac weakness is very marked, and

there is usually copious nasal discharge. Weakness is marked in both diseases, but in influenza the temperature is not remittent, and there is far greater tendency to complications.

(2) *Hæmoglobinuria or Azoturia.* In this disease there is usually the typical history; there is no marked jaundice; there are the sudden paralytic symptoms and "boarding" of the muscles, and the temperature is not so high as in biliary fever. Moreover, this disease is not common in army horses, owing to efficient stable management.

(3) *Liver Disease, Obstruction, Jaundice, or Duodenal Catarrh.* In these the temperature remains about normal, febrile symptoms are absent, and there is the characteristic condition of the mouth, etc.

(4) *Equine Croupous Pneumonia.* May show the sudden rise of temperature and some jaundice of the conjunctiva, but the prominent symptoms of pneumonia are not present in biliary fever, and a mistake could only occur during the first day or two.

(5) *Purpura Hæmorrhagica.* This generally follows a pre-existent disease, the temperature is lower and rarely exceeds 104° F., there is no icterus, the œdema is sharply circumscribed with the characteristic tendency to "weeping."

(6) *Surra.* The initial attack is milder and the temperature is not so high, and there are the characteristic remissions of five or six days. Epiphora is more marked, and the trypanosome will be found in blood preparations made during the paroxysms. In all the cases of doubt the finding of the parasite confirms diagnosis, and in biliary fever there is almost always an immediate response to treatment.

Treatment.

Many drugs have been used in the treatment of this disease, but even the latest books on veterinary medicine do not appear to describe the specific treatment. Hutyra and Marek's *Special Pathology and Therapeutics*, 1920, states, "The specific treatment has so far failed to give uniform results." This apparently consists of large doses of quinine per os, alternated with chloride of ammonia, etc.

The German workers, Knuth, Behn, and Schulze, in Macedonia, in 1916, also state that no specific remedy has been found. They used quinine in bolus (10 grammes daily) without success, also trypan blau (1 to 2 grammes daily) intravenously in 1 per cent. solution, and neosalvarsan, but did not obtain any good results from these.

The experience of veterinary officers in India who have adopted the treatment is, I believe, that *intravenous* injections of yellow acid hydrobromide of quinine give uniform and excellent results, and in cases treated early the disease is at once controlled, and complications and sequelæ practically never occur. This is certainly my own experience. I was taught the treatment when I first arrived in India, in 1913, by Lieut.-Col. A. J. Williams, D.S.O. (then Major Williams), at Secunderabad, and there was a Standing Order in that Veterinary Hospital that an examination was to be made immediately on admission to hospital of the blood of all horses affected with fever, œdema, debility, and paraplegia. If *N. equi* or *P. caballi* was found or clinical symptoms of Nuttalliosis were present, the injection intravenously of one drachm of yellow acid hydrobromide of quinine was to be carried out at once. I can remember no case during the eleven months I was in Secunderabad that suffered from complications or died. Since then, especially in Neemuch, Nasirabad, and Sehore Remount Depot, in 1919, 1920, and 1921, I have adopted this routine of blood examination in all cases of fever, debility, œdema, etc., and with one or two at the most exceptions quinine treatment has been uniformly successful in diagnosed cases. Remissions have been very rare, and where they occurred a second injection has cured the case. A reference to the attached temperature charts will clearly show this. I will presently describe some cases treated with other drugs, but first a brief description of the technique of the treatment will be convenient.

First as to the strength of the solution and the quinine salt used. Various experiments were tried with a view to obviating the toxic effect of the quinine at the time of injection, which manifests itself by symptoms of staggering and loss of co-ordination in the limb muscles. Varying dilutions were tried from one drachm in an ounce of boiled or distilled water to one drachm in half a pint, but the dilution appeared to make little or no difference. The toxic symptoms depend largely on the degree of fever and weakness of the animal at the time of injection. The symptoms seem to be proportional to the temperature, and practically non-existent in cases where the temperature is not very high. Even in severe cases the toxic effects may not be noticed unless the animal is made to move. It was found that grs. $\frac{1}{2}$ of strychnine hypodermically before the quinine injection usually prevented, or at least minimised, the toxic symptoms by overcoming the depressing effect of quinine on the heart and circulation. The rapidity of the injection may make a difference and toxic symptoms are possibly more likely to occur if the injection is made too quickly. The dose of quinine yellow acid hydrobromide is from $\frac{1}{2}$ to 1 drachm for light draught horses and riders.

Technique. The apparatus used consists of a glass or enamel funnel with a handle: about one foot of rubber tubing with a piece of glass tubing inserted about two inches from the needle end (to act as a window through which the solution can be seen flowing), and a hypodermic needle which is to be inserted in the vein. There is also a jugular compression apparatus, consisting of a webbing strap with a sliding pad and a buckle, and provided with a quick release. This is strapped round the neck with the pad in the jugular furrow and pulled up so that the vein becomes prominent. The quick release on the strap should be on the same side of the neck as the operator. The hair is clipped off a small area over the jugular vein, and the skin painted with tincture of

iodine. The funnel, tube and needle, previously carefully sterilized, are then used as follows:—The needle is inserted into the vein with the point directed backwards (towards the heart) the blood then flows up the tube. The quinine solution (1 drachm in 1 ounce of distilled water at about blood heat) is then poured into the funnel and the compression pad on the vein released by opening the quick release. The solution then flows evenly into the vein. As soon as the solution reaches the bottom of the funnel, and before any air can enter the tube, a little normal saline solution is poured in, and when this in turn reaches the end of the funnel, a little more is poured in, and this is repeated twice. This washes the quinine out of the tube and needle and obviates the chance of any quinine entering the perivenous subcutaneous tissues when the needle is withdrawn. When all the saline solution is run in, this can be seen through the glass window in the tube, and before any air can reach the vein the tube is pinched, and the needle withdrawn. In inserting the needle it is best to pass it first through the skin into the subcutaneous tissue, and then into the vein. Should any quinine solution escape into the subcutaneous tissue, a necrotic abscess will result, and probably purulent phlebitis; but this should not occur if care be taken. In an experience of probably two hundred injections I have only had one accident, and that was in a very restless horse. I have, however, seen two very bad cases of jugular phlebitis, where the injections had been performed by an Indian Salutri, without proper precautions.

THE EFFECT OF THE INJECTION. There is an almost immediate drop in temperature of one or two degrees in the next twenty-four hours, and to normal in forty-eight hours. The jaundice begins to be lessened and petechiæ begin to disappear by the second or third day. Appetite returns, and the animal speedily begins to recover. A remission about the third or fourth day, sometimes the fifth day, may occur, but this is immediately checked by a second injection of quinine. Unfortunately, a number of my own notes and temperature records were lost when I left Neemuch, but I have copies of six of them, together with eleven records made by the veterinary assistant at Neemuch while I was away from there on temporary duty in August and September, 1921. Two charts of cases treated with intravenous injections of tartar emetic are included. [The Editor regrets that lack of space has necessitated omission of the charts.]

Isolation of cases and attention to nursing is, of course, very important; the animal must be given a good bed, protected as far as possible from flies, and made comfortable. Water should be kept in the stable, and green food, lucerne, etc., used to tempt the appetite. Bandages may be put on the legs, and an eye fringe should always be worn. Salines in the drinking water, and stimulants, such as carbonate of ammonia balls, are indicated to assist the circulation. Calomel, 1 to 2 drachms, is useful to help to clear up the jaundice, and clear the duodenum of inspissated bile, etc. which may be present. In India a very useful anti-fly spray is issued by the Medical Store Depots, and the use of this and such dressings as cheer pine oil, lightly applied over exposed parts of the body, will help to keep away flies. Light clothing is also exceedingly useful. If cases have to be treated in the open, protection from sun is very necessary, as exposure to it increases the severity of the disease considerably. During convalescence arsenic and iron are useful, especially after severe cases, but with most cases which are treated early there is not much loss of condition, and convalescence is correspondingly shortened. A good diet is all that is normally required for these, but horses should not be put to work for two or three weeks, even after the milder cases. After severe cases five or six weeks is necessary for convalescence, and gentle exercise in the early morning is indicated. In cases with congestion of the lungs as a complication, the removal of one or two pints of blood, and the injection of normal saline solution (about two pints), is useful.

Other drugs I have used are trypan-blau and tartar emetic, and these will now be discussed.

(1) *Trypan-blau.* This has for a long time been one of the principal drugs used in treating piroplasmosis, especially red water in cattle. In Nuttalliosis it is very useful alone, or in conjunction with quinine. Cases which do not recover when treated with trypan-blau may be treated by an injection of quinine, and *vice versa*, and usually those cases which do not recover with the one do when treated with the other. One hundred to two hundred cubic centimentres of a 1 per cent. solution is used intravenously with the same precautions as when using quinine.

(2) *Tartar Emetic.* This drug was used by veterinary hospitals in the Central Provinces District, and six consecutive cases were treated with it and reported upon. I understand that some veterinary officers found the treatment, which consisted of tartar emetic 1 drachm in bolus, twice daily for three days, and repeated after a three days' interval, if necessary, to be beneficial, but in my own experience it did not appear to influence the course of the disease to anything like the extent that the quinine does, and three of my cases were treated with hydrobromide of quinine when the remissions of temperature and symptoms occurred about the third or fourth days.

(3) *Tartar Emetic Intravenously.* The injection of tartar emetic intravenously was first tried (as a result of a circular letter describing the treatment) in doses of five grains in one ounce of distilled water. This caused a fairly rapid fall in the temperature within forty-eight hours, but remissions sometimes occurred, though not as severe as the first attack, and the treatment was undoubtedly useful. I then tried increasing the dose to 7½ grs. in 1½ ounces of distilled water, and the results of this treatment were nearly equal to the quinine treatment. The temperature fell to normal within twenty-four to forty-eight hours almost in every case, and remissions when they occurred, nearly always responded to a second injection. It only appears to be inferior to quinine in so far as a remission of the disease does occur a little more often than when quinine is used. It is necessary

to be extremely careful that none of the solution enters the subcutaneous tissue when this treatment is carried out, and the same precautions as to washing through the tube with normal saline, etc., should be observed as when using the solution of quinine hydrobromide, otherwise necrosis and sloughing would occur. The toxic symptoms sometimes observed when injecting quinine are not seen when using the tartar emetic solution, which furthermore has the advantage of cheapness. I consider this method of treatment a very valuable one.

PROPHYLAXIS. (1) Everything possible should be done to keep down flies of all kinds. Manure should be removed a considerable distance from the lines, pools and drains should be attended to, and any place where mosquitoes, etc., can breed, filled in, or the surface of the water kept covered with a film of paraffin. Dung must be constantly removed from the lines, and the anti-fly spray used two or three times a day. The use of the so-called flytraps in stables helps to keep down the fly nuisance. It is based on the fact that flies always lay their eggs on fresh manure, and if small boxes or tins, say a foot square, are filled with fresh dung and left in the stables away from sunlight and not too near the horses, the flies will deposit their ova in them. The boxes can then be removed and the contents burned before the larvæ have time to hatch out. These traps should be renewed twice or three times daily. Light clothing and eye-fringes are valuable as protection from flies.

(2) Cases should be isolated in the part of the hospital kept for the purpose, and here again protection from flies, by means of chics hung outside the stables, and light jhools is very valuable.

(3) Where ticks are prevalent steps should be taken to eradicate them. A search should be made for them every time the horses are groomed, special attention being paid to the ears, perineum, eyelids, and inside the thighs. Cattle should be moved from the vicinity of the stables, as they are nearly always infected with ticks. The blow-lamp should be used freely in the stables, especially in all cracks and corners. Bedding should never be put to dry or stored where bullocks are kept, and if the bullock shed is close to or in the unit lines, as it often is in India, the horse bedding must be carefully kept away from the bullocks, or, better still, the bullocks removed.

(4) Grooming of animals should be thoroughly attended to. There is always a preference shown by flies for a dirty animal. Where many horses are becoming affected the use of cheer pine oil lightly applied after grooming to the exposed parts of the body is useful.

BIBLIOGRAPHY.

1. *On the occurrence of two species of parasites in Equine Piroplasmosis, or Biliary Fever*, by George H. F. Nuttall, F.R.S., and C. Strickland, M.A., B.Sc., in *Parasitology*, Vol. 5, No. 1. February, 1912.

2. *Notes on a thick film method of staining piroplasms and anaplasms in routine veterinary diagnosis*, by A. Goodall, M.R.C.V.S., Department of Agriculture, Union of S. Africa, in *Journal of Comparative Pathology and Therapeutics*, Vol. 33. June, 1920.

3. *Investigations into Equine Piroplasmosis in* 1917, by Prof. DaKnuth, Dr. P. Behn, Dr. P. Schulze, in special reprint from the *Zeitschriff Fur Veterinarkunde*, 1918.

4. *The treatment of Nuttalliosis or Biliary Fever in Horses in Secunderabad (Deccan)*, by Major A. J. Williams, F.R.C.V.S., R.A.V.C.

5. *Special Pathology and Therapeutics of the diseases of Domesticated Animals*, by Hutyra and Marek, 1920.

Foot-and-Mouth Disease.

STAND-STILL ORDER NOT TO BE ISSUED.

During the past fortnight the Minister of Agriculture has had under consideration representations made to him in favour of the imposition for a period of three weeks of a "Stand-Still" Order for all cattle, sheep, pigs and goats with the object of hastening the eradication of foot-and-mouth disease.

To be effective for the purpose in view the Ministry considers that it would be necessary:—

(*a*) To maintain an Order of this kind in operation for at least twenty-eight days;

(*b*) To apply it to the whole of the infected areas, which include nearly all the Midland and Northern counties of England, as well as certain Southern and Eastern counties, and also parts of Scotland; and

(*c*) To apply the Order not only to store animals, but also to those intended for slaughter, inasmuch as the experience of recent months has shown that the movement of fat stock is attended by as great a danger of the spread of infection as that of store stock.

This would mean that fat stock would not be allowed to be removed alive for slaughter, but would have to be killed and dressed on the farm, and that the urban centres would have to set up some organisation to ensure an adequate meat supply for their populations.

The prohibition of the movement of store stock also, even with modifications to admit of purely local movements by licence for the essential purposes of milking, feeding, and for emergencies would, especially at this time of the year, be attended by grave inconvenience to farmers engaged in re-stocking their farms and in arranging for the return of sheep from their winter quarters. To this must be added the heavy losses which would result to the distributive branches of the livestock industry, and therefore to the consumer, from the application of the Order.

The Minister has carefully reviewed all the circumstances for and against the adoption of this expedient, and has come to the conclusion that he would not be justified in imposing upon the public an Order of so onerous a character as that proposed. Moreover, the Ministry thinks that the enforcement of such an Order would be found to be impracticable, and that even if an attempt to enforce it were made, it would not be possible to guarantee the desired results. The Minister has, therefore, definitely decided against the issue of a Stand-Still Order.

Obituary.

On Wednesday, April 2nd, 1924, Ada Margaret, the beloved wife of Thomas Salisbury Price, M.R.C.V.S., of "St. Julians," Leigham Court Road, Streatham Hill, London, S.W., aged 60 years.

The Veterinary Record.

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TUBERCULIN—AND OTHER THINGS.

The letter from Sir Stewart Stockman which appeared in our columns last week on the subject of the "Milk Scandal," though written with the intention of correcting what he holds to be a wrong impression conveyed in our leader of March 22nd, contains statements which should be very carefully considered by the veterinary profession, who will doubtless see in them further confirmation of the feeling which is held by so many that the Ministry of Agriculture is out of touch with the profession, that it by no means represents veterinary opinion, that it has too little sympathy for veterinary aspirations.

We should regret that any person should think we would willingly mislead, and we might qualify our assertion that the Therapeutics Substances Bill provides for "proper" control of tuberculin, in the full sense of the term, as we veterinary surgeons understand it. It is, however, a good first step towards that protection which we have been demanding for so many years, in that it at least provides for the standardisation of the quality of veterinary biological products, and we consequently believe we have good cause for strongly condemning the attitude of the Ministry of Agriculture towards this Bill. It was not our intention to imply that the Ministry of Health had agreed to or had in mind the control of veterinary tuberculin, though it is not unreasonable to believe that the Ministry of Health would welcome that control. There can be but little if any doubt that, if the Bill passes through Parliament as drafted and published, tuberculin and other veterinary biological products will be automatically included under its provisions. That this is so is demonstrated by the fact that the Ministry of Agriculture has deemed it necessary expressly to ask for the exclusion of veterinary preparations from the provisions of the Bill. No further argument is required.

We are not concerned with any statements which Sir Stewart Stockman may have made to the Royal College of Veterinary Surgeons. These statements, whatever they may have been (and we do not for one moment suggest that what Sir Stewart says regarding them is otherwise than correct) and the discussion of the Bill were made in Committee, and it is not usual for statements made in Committee to be made public, although Sir Stewart does not appear to consider himself out of order in so doing. The veterinary profession has no knowledge of the discussions of the sub-committee, the report to the Parliamentary Committee merely saying "The sub-committee . . . was not prepared with a report on the matter" (*V.R.*, page 104). We are very much concerned, however, with a statement in the latter part of Sir Stewart's letter where he says "*the Ministry of Agriculture does not wish veterinary preparations to be included in the principal provisions of this Bill.*" Why? Is the profession always to be compelled to put up with an inferior article? Are all veterinary biological products to be especially labelled with the word "veterinary"?—in this case synonymous with "inferior" and "non-standardised." This would appear to be so if the wish of the Ministry of Agriculture is to prevail. Our profession for years has been urging the necessity for the standardisation of the manufacture of tuberculin and other biological products; without it our work is rendered variable in value, and undependable. It is perfectly well known to some, and it should be known to all, that there are tuberculins on the market of variable potency. Tests made with their aid are therefore not conclusive. That is at least one good reason why foreign buyers of our pedigree stock specify a special brand of tuberculin to be used in making the test, thus tacitly showing their doubt of the potency and value of other manufactures. Moreover, many veterinary biological products which have been tested have been found to be inert, or at least of doubtful potency; this being especially true of foreign imported preparations. A Bill is before Parliament that would put an end to this unfortunate state of things (no matter what the intentions of the Ministry of Health may have been), but it is to be rendered nugatory at the instance of the Ministry of Agriculture.

Sir Stewart would, apparently, have us believe that because we cannot get all our demands satisfied by this Bill it would therefore be better for us and the country to have nothing at all. In the meanwhile we are not to know what is the attitude of the Ministry towards the control of the sale of tuberculin. If its attitude towards the control of purchase is similar to its attitude towards the standardisation of quality, then the outlook is not hopeful.

(*Continued in first column of next page.*)

Clinical and Case Reports.

The Editor will be glad to receive from members and others contributions to this column of reports of interesting cases.

The Distemper Outbreak of 1922-1923. 331 Cases treated by a Vaccine of the Bacillus Bronchisepticus Canis (Ferry).

By J. F. D. Tutt, M.R.C.V.S., F.L.S., F.Z.S., Winchester.

History of the Outbreak.—Sporadic cases occurred as early as June, 1922, and continued at irregular intervals during the summer until the end of September, when, from October onwards until well into the early spring of 1923, the disease became a scourge.

It was not all uncommon to go into an outlying village and find that practically the whole dog population was practically extinct. The local hunts suffered severely, one kennel losing no less than sixteen couples. At the local "garden city," populated by artisans and workpeople the mortality was enormous, rumour putting as many as sixty or more as dying within an area of two miles. That the disease was a very virulent and often rapid one, there is not the slightest doubt. The most remarkable fact about the outbreak was that it attacked the full-grown dog rather than the puppy. The disease gradually died down with the approach of summer, but a smaller outbreak occurred in September of last year, and at the time of writing, the writer has several under treatment.

Symptoms.

These were variable in the extreme. In many cases, the so-called cardinal symptoms, i.e., cough, discharge from eyes and nose, erythema, were conspicuous by their absence. In one day, no less than six dogs were brought in with epileptic convulsions, the owners stating that the dog had shown no other symptoms. In other cases, paralysis of the hind limbs or chorea was present.

In the majority of cases, the first thing noticed was inappetance and a disinclination to feed, with or without occasional vomition of frothy mucus or food; this continued in some cases for several days or even weeks (three weeks in one case). Sooner or later, definite symptoms, either respiratory, intestinal, or nervous, of distemper became manifest, and the disease was then very rapid, and often fatal. The emaciation was very marked, in fatal and non-fatal cases, and in many cases so severe that destruction, or death, resulted.

Respiratory form.—I considered it would be interesting to record as many cases as practicable, and as a result, I have a record of 331 cases that were treated with vaccine. This list shows that the respiratory form predominated. When taken early, treatment was usually successful, but unfortunately this was not often the case, and inoculation was not made in many cases so early as it could have been. If it had, the mortality, I am sure, would have been less.

In the early stages, the usual cough, and discharge from the eyes and nose were noted. Later, pneumonia, usually septic, followed, and was invariably fatal. *Post-mortem* revealed the lungs "black," and literally "falling to pieces," i.e., gangrene.

In recovering cases, it was not unusual to find sloughing of the mucous membrane of the nasal chambers, and of the lips in some cases the process penetrating the entire thickness of the lips. Ocular complications were common. Ulceration of the cornea, pupillary paralysis, and so on, often proving troublesome, and in some cases complete blindness followed, although to external appearances the eye appeared normal. In these cases the optic nerve was no doubt the trouble. In other cases, purulent conjunctivitis persisted for some time. In one particular case, a diphtheroid bacillus was isolated and an autogenous vaccine made, and recovery resulted. The breath often remained highly offensive for a varying period after recovery. In cases terminating in septic pneumonia, the nasal discharge assumed a rusty-coloured tinge, and in some instances there was rather considerable hæmorrhage.

Simple and uncomplicated cases usually responded to treatment. Many dogs were lost through the owners neglecting to bring them in at the specified date for inoculation for the second or third time.

Intestinal form.—Diarrhœa, usually profuse and frequent, and often blood-stained. Emaciation more or less rapid. Vomiting, either of ingested food, or mucus, bile or blood-stained, or of a thin, glairy, more or less viscid nature. The intestinal form was often primary, and secondary in other cases to other symptoms, usually the respiratory. These cases were usually fatal.

Nervous form.—The majority of the cases either had nervous symptoms as a sequel to the respiratory or intestinal form, as or a primary one. The latter was invariably fatal.

(*Continued from previous page.*)

We are quite aware that the control of tuberculin raises very important and controversial questions, but such objections as may be raised can be overcome when it is clearly understood that control is necessary for the public welfare. We have before drawn attention to our regret that the Ministry of Agriculture has not placed itself in closer touch with our profession, and been more in sympathy with it through the medium of its Chief Veterinary Adviser. This Association and its divisions has given the latter very generous support in the anxious and troublesome times through which he has lately been passing. We should like to have seen a little reciprocity.

We say once more that we are dissatisfied with the action of the Ministry of Agriculture, and we believe that its attitude toward the Therapeutic Substances Bill is at total variance with the opinion and wishes of the veterinary profession.

When primary, these were either in the form of epileptic convulsions, chorea, or paralysis of the hind limbs, and in a few cases of all four limbs. Meningeal symptoms were observed in the younger dog (a year), but were not common.

Suppurative and phlegmonous symptoms. As noted under respiratory form, suppurative lesions were often noticed, particularly of the lips. A few cases had swellings over the parotid region.

Cutaneous and eruptive symptoms.—Were not often encountered. Excessive caution in "waiting" for these when no other symptom beyond inappetite was noticed, caused failure later to treat some cases successfully that might otherwise have been saved.

Hepatic symptoms.—Were observed in about six cases, all dying.

Course of the disease.—In some cases a rapid recovery, in others as rapid death. In many recovered cases, it extended to two or more months. The average was six weeks in recovered cases (three weeks bad, three weeks convalescence).

Mortality.—The death rate was very high. Records made of cases inoculated, show 95 dying, 37 destroyed, and 11 unknown (probably died), out of 331 treated. Several were destroyed, treatment being hopeless. In one day eight were destroyed, another six, and so on.

Treatment.

The ordinary vaccines on the market had been tried during previous outbreaks, and with disappointing results. A mixed bacterin was tried and was the same. It was then decided to try a vaccine with Ferry's *Bacillus bronchisepticus canis* only, in the proportion of 1,000 million per c.c.

Injections were made at two to four day intervals, depending on the severity of the case, starting with an initial dose of a quarter of a c.c., and increasing up to half a c.c., or more, but not more than 1 c.c. at any time. This vaccine is a very powerful one, and in the majority of uncomplicated cases gave very gratifying results. Where it broke down was often in the pneumonic type, no doubt due to the fact that other bacilli or streptococci were present. In the nervous form, its value is distinctly doubtful, but in the ordinary respiratory form its value and success have been great. It would appear that this bacillus is the commonest and the usual primary, at any rate, bacillus present. This rather explains why cases taken early and treated with it respond readily to treatment. The number of injections varied and was judged by the severity or otherwise of the case. Three injections is the average. It is true that 198 out of 331 treated recovered by its use, and, although this is little more than half, this vaccine is certainly a distinct advance on others.

Respiratory.—A mixture of the following has given the best results:—

Syrup of garlic, dose of m x. to m xx., depending on breed and age of dog;
Glykeron or glycero-heroin, m x. to m xxx., depending on breed and age of dog;
Aqua to desired quantity:
Given every three hours.

In cases uncomplicated by diarrhœa, liq. ammon. acet. conc. was sometimes added, or infusion gentian Co. In cases accompanied by diarrhœa, bi. salicylate in gr. v. doses was added, or if sickness bi. carb. gr. v.

Oxygen inhalations were resorted to in pneumonic cases, and often with great success: Case No. 250 being on oxygen for ten days and making a good recovery. In cases with cardiac weakness, beneficial results were obtained from tabellas trinitrini (dose, half to one tablet every four hours).

Latterly on a few selected cases, the patent medicine "Lintox" was tried, but personally I do not consider it as good as the garlic mixture, which cannot be improved upon.

Inhalations of steam, medicated and non-medicated, gave relief in many cases.

Intestinal.—For diarrhœa, bi. salicylate in gr. v. doses every three to four hours, salol gr.iiss. (two and half grains) to gr. x. every four hours, potass. permang. gr. 2 and most of the intestinal astringents and sedatives were used. Of the preceding, salol gave the best results, but latterly gelatine capsules containing creosote in m.ss. to m.i. doses, with or without bals. tolu m.ss. to m.2, repeated three times a day, have held the diarrhœa in check. In conjunction with these agents, the garlic mixture has been given: where bi. salic. was used, this was added to the mixture.

For vomition, chloretone (F. D. and Co.), gave the best results. Morphia was given hypodermically in some very bad cases, but was not always successful.

The garlic mixture, in conjunction with creosote capsules, proved the most reliable remedy.

Nervous.—In no instance does any particular medicinal agent stand out as the best. Very big doses of bromide were given, and in some instances were successful. Where the bromide was given over a prolonged period, a preparation known as fructole bromide (Savory and Moore) in ℥ss. to ℥ii. (depending on patient's breed and age) was administered. This preparation has the advantage of diminishing the risk of bromism.

Chloretone was tried in severe cases of epilepsy, but did not give very good results. Morphia hypodermically gave relief from epilepsy in three instances, but afterwards the animal could not rest for any length of time, wandering from one room to another, and destruction usually had to be done. Luminal, sodium and potassium borotartrate were tried on cases of chorea, and also violet ray, but with no appreciable result. Two mild cases of chorea were treated with parathyroid extract.

Suppurative and Phlegmonous Symptoms.—Mouth washes for mouth lesions, ordinary antiseptic lotions for other lesions, and tonics were given.

Hepatic Symptoms.—These were usually so rapid that treatment was hopeless. In the distemper outbreak, the six showing these symptoms all died. The symptoms were associated with previous and co-current intestinal. Trypanblue injections gave no success, but the cases were so hopeless that no agent could be expected to do much good.

For jaundice occuring as a primary disease, unassociated with distemper, saline injections, with the frequent (three to four times daily) administration of pills containing:—

℞

Fel. bovis. purificatus	...	gr. 2
Euonymin	...	gr.ss.
Acid citric	...	gr. 1

Ft. Pil. i.

has so far been attended with good results.

Summary of Records of 331 Cases.

Total treated	331
Cured	198
Died	95
Destroyed	37
Unknown	11

Missing a Calf in Utero.

By F. T. Harvey, F.R.C.V.S., St. Columb.

Probably most practical men with years of experience behind them would scout the idea of ever missing a calf *in utero*, but the present note may be of interest to students and recent graduates, should it prove too elementary for the experienced practitioner. The matter is not quite so simple as it would appear on the surface, as we are reminded by a note in the *Veterinary Record* for February 23rd. Here Mr. H. V. Lowe mentions a case in which he could find nothing, and yet, four days later, a *post-mortem* revealed a calf in the peritoneal cavity of the cow. The subject is of some interest, for it is possible in a case of the kind for a captious client to prefer a charge of carelessness, or negligence, against the professional attendant, should an unsuspected calf be revealed on *post-mortem*.

There is no doubt that it is quite an easy matter to miss a calf *in utero* under certain conditions, though it may require some courage to admit the soft impeachment. A calf in the peritoneal cavity four days after the commencement of labour is nothing to be surprised at, for we have only to surmise the uterus passing into a state of tonic contraction, and at the same time the fœtal tissues becoming invaded by gas-producing organisms, for the accident to happen. Rupture of the uterus takes place and, as the calf gets bigger, the rent increases, and the position of the former may at any time become extra-uterine. Of course, this may not have been so in the above case, but I have known it to occur.

I have certainly been surprised now and again at having done a fair amount of exploration, etc., in delivering a cow, without having become suspicious of the presence of a second calf. It is best then to make sure by introducing the hand and searching for a possible twin calf, or a ruptured uterus. On one occasion, having removed a second calf, I omitted this procedure, and a third one appeared on the scene some time later. As a rule the question of the presence of a calf is quickly settled, but there are one or two conditions in which it is necessary to be very cautious in giving an opinion.

A cow with twin calves and the complication of hydrops amnii, or a large pot-bellied animal, may easily get one into difficulties, especially if the arm is short. On one occasion, having delivered a cow which had passed many gallons of "waters," I again introduced the arm up to the shoulder (my arm is quite a long one), and made a sweeping movement with the hand around the uterus, the latter forming a very large cavity, and at the same time informing the owner the purport of my search. I felt nothing, and was very surprised on returning the following day to find that another dead calf had been taken away. Of course, in this case the calf, a small one, was downward and forward, and quite beyond reach at the moment.

Many years ago I saw a cow with hydrops amnii, and was sent for a day or two later to see her again, as labour pains had begun. The stall was flooded, and on exploring I could just touch the fœtus with the tips of my fingers, so decided to wait a few hours (the patient seeming comfortable) for the calf to come the better within reach. Returning to the case in the evening, I was horrified to find the cow tympanitic, and bigger than before the escape of the waters. Gas-forming organisms had done their work, and the fœtus ballooned.

When in doubt in these cases it is best, before giving a definite opinion, to examine the cow down, or otherwise raise the floor of the abdomen and then re-examine. It is sometimes necessary to be very cautious when testing for pregnancy by means of a rectal examination. Some time ago I examined in this way a fat cow over 200 days pregnant. Her stomachs were rather loaded at the time. Nothing suggestive of the fœtus could be felt *per rectum*, and the examination was carefully carried out. It is easy to give a positive opinion when the fœtus can be felt, but to form a negative one, because you are unable to palpate it, is not always wise.

Amputation of Rectum in a Sow.

By W. S. Collinson, M.R.C.V.S., Sheffield.

Subject.—Large white sow, suckling six pigs three weeks old. The rectum had been prolapsed four days when I saw her, and was very much bruised and torn, due to her catching it each time she laid down on a guard rail erected round the sty for the protection of young ones. The prolapsed portion would be quite as large as a very big cocoanut.

Method.—I chloroformed the animal and secured the legs together. A clean sack was placed under the hind quarters, after washing the prolapsed bowel. I inserted an ordinary carriage candle into the rectum and instructed the owner to hold it in position. He pushed it too far in after I had inserted my first suture. After a little trouble I recovered it and tied a piece of string to the wick; this gave something

(Continued at foot of next page.)

Abstracts.

Statistical and General Report, Army Veterinary Services, 1922-1923.

It is, perhaps, a minority that really delight in reading through a statistical report, no matter what the subject, as it is only a few who have the gift of readily assimilating masses of figures and percentages. The above report should, however, appeal to the ordinary practitioner as much as to his military confrère for whom, of course, the report is primarily intended. It is only by compilation and study of the statistical tables set out that a true perspective of the value of the work of the Royal Army Veterinary Corps can be obtained. This does not mean that the column relating to the number of cases cured is the only guide, but one can trace the work of the conscientious veterinary officer by studying the number of admissions of cases of a preventable nature, and the percentage of infectious and contagious diseases. It is impossible, in a necessarily short review, to analyse all the figures, but in Table XXVII. (Wastage by Arms of the Service) one is struck by the great difference in the various arms of the percentage of constantly sick and lame horses, and one cannot but think that horse-mastership is not sufficiently impressed upon those in charge of the horses in some units. As is pointed out, no similar report was issued for the years 1914-1920, so that comparisons are not available, but the statement is made that that horse-mastership generally is improving, and it is hoped that the pre-war standard will eventually be reached. The annual report of the Royal Army Veterinary School at Aldershot is embodied in this report, and shows that this institution continues to carry out its very valuable work as an educational centre for matters appertaining to the care and management of the horse and other animals employed in the army. The laboratory attached to the School is also fully engaged in investigation and diagnostic work, and much valuable information has been recorded that will prove of economic value in the future. The report as a whole proves that the Royal Army Veterinary Corps performs a large amount of work of great economical value and carries out that work well.

(*Continued from previous page.*)

on which to hold, and kept the candle in its proper position. Owing to the swollen condition and inability to retract more bowel, I could only get in six interrupted sutures, which I inserted parallel to the sphincter ani, pushing the needle through to the candle each time and returning and tying. Three sutures were applied with the sow on one side, and then turning her over and suturing her on the other side. The damaged portion was removed about one inch in front of the sutures, the stump dressed with iodine and returned. I gave the owner some chinosol ointment and told him to insert a little three times each day, and keep bowels in order by giving small doses of mag. sulph. It is a month since the operation, and the owner says that the sow has never looked back. She was refusing food when I first saw her and before operating. I castrated her offspring yesterday, and could not see anything abnormal with her. The sow has been in very fair condition all the time. This trouble is, in my experience, usually met with in animals in poor condition.

Defensive Reactions.

One of the drawbacks of symptomatic treatment is the risk we run of tampering with reactions which have for object the defence of the organism. Take diarrhœa, for instance. In most cases this is protective; it is nature's way of getting rid of peccant matter from the alimentary canal. To seek to bottle it up by means of astringent drugs is to court disaster. As a matter of fact, an aperient is usually indicated far more than an astringent. Then, too, with arterio-sclerosis, in most instances a high blood-pressure is a reaction of defence. Without it the circulation could not be carried on. Fortunately our efforts to control blood-pressure usually fall short of the mark unless our measures are aimed at the underlying cause of the heightened tension. The blood-pressure, after all, is only one manifestation of a complex syndrome. We meet with patients who live a comfortable existence with a pressure of 250 to 300 mm., while others die with a pressure not exceeding 190 mm., so that there are other factors to be considered when we are confronted with this circulatory disturbance. These remarks apply *mutatis mutandis* to fever. We are aware that the optimum temperature for most micro-organisms that infest human beings is that which is normal for man, consequently a rise of several degrees tends to hamper their proliferation. It follows that it is not only unnecessary, but is distinctly inadvisable to administer antipyretics merely for the purpose of reducing the temperature except, of course, in cases where life is threatened by a high temperature *per se*. If we can attack the cause of the fever as do quinine in malaria and the salicylates in rheumatism well and good, but the popular practice of giving a dose of aspirin just to lower the fever is irrational and has nothing to recommend it.—*Medical Press and Circular*, March 5th, 1924.

Ayrshire Veterinary Association.*

A meeting of the Ayrshire Veterinary Association was held in Ayr on December 13th, 1923, when the majority of the veterinary surgeons practising in Ayrshire were present. The President, Mr. George Scade, Galston, was in the chair and gave his presidential address, of which the following is a summary:—

Gentlemen,—At our last meeting here you did me the honour of appointing me President for the ensuing year, an honour I appreciate very much, and for which I thank you. Our Association is not an old one, and we are not very numerous, but what we lack in numbers is made up

* Received on March 8th, 1924.

in enthusiasm, and I think I am safe in saying that we have all benefitted, both socially and professionally, in forming and joining this Association. It is usual on such occasions as this to speak of our present conditions and future prospects. I will divide my address into two parts; firstly, I will refer to our general conditions and prospects, and, secondly, I will give you a few notes on parturition cases in cows.

You will all agree with me that the past year has been one of the worst in our remembrance, both from the point of view of weather and trade conditions. There is no doubt our prosperity is bound up in the prosperity of agriculture. The farmer is very quick to learn things that it does not pay him to produce, and acts accordingly. Horse breeding is a good example of that, and until trade improves and the demand more approximates the supply, horses will not pay to breed. Ayrshire is not what one would call a horse-breeding county, and the farmers are now relying on the milk supply to pay their rates and taxes. Fortunately we have in the Ayrshire cow a breed second to none in the production of milk, as the recent awards at the late Dairy Show in London go to prove. Not only is she a good milker, but the Ayrshire farmer produces his milk under as clean conditions as any farmer in the country. I do not mean to say that the conditions are perfect, but the byres are gradually being improved, and this is most important when we consider the length of time the cows are housed. There is no doubt that this long confinement tends to render them more liable to tuberculosis, and I believe I am within the mark when I say that in Ayrshire milk cows we have 75 per cent. reactors. The sooner the Tuberculosis Order is re-introduced the better it will be for both producer and consumer, and the sooner the sale of tuberculin is restricted the better it will be for all concerned.

Experience teaches us that we know very little about a great many diseases, even amongst those we treat more often with the best results, such as milk fever. It is only the "quack" who can tell you all about it. I cannot get over the feeling that the veterinary surgeon himself is the greatest sinner in the production of the unqualified practitioner. One has got to be prepared to do anything, and not relegate the dirty jobs to some other person. No doubt the veterinary surgeon of to-day and of the future is and will be a more highly-trained and scientific man than he was in the earlier days, but there always will be a lot of hard, dirty work for the country practitioner to do, and unless he is prepared to do that, it would be far better if he chose some other profession.

Our services under Public Health in the future will be more utilised than they have been, and a great many appointments should be open for us and our younger members of the profession in that direction. Theory and practice are very different things, and one may qualify and be of very little use as a practical veterinary surgeon. A good deal has been written of late about students and the necessity of every student having to spend so much time seeing practice with a veterinary surgeon. There is no doubt that it helps greatly when one gets on one's own, and the more practice one gets the more confidence one obtains. I think that a year spent after passing the third examination would do more good to the student than a year spent before starting college at all; he would be more likely to qualify and be of more use when qualified.

Research is, at the present moment, on everybody's lips, and no doubt along that line lies the road to the elucidation and treatment of those diseases about which we know very little.

I am rather inclined to the belief that some of those diseases we encounter nowadays are more malignant than they were in earlier years, *e.g.*, distemper in dogs. I must confess that the treatment of distemper in my hands, both prophylactic and curative, has been anything but happy. I had an old retriever bitch which bred fifty pups for me before I put her down. I kept two of her last litter, and inoculated both three times according to instructions; one is now in pup at three years old, and has been in contact with distemper cases all her life, but has never shown the slightest symptom of the disease; the other died from distemper when she was a year old. It is no proof to say that the vaccine prevented the one from taking distemper, because I find the same thing happens in uninoculated dogs, and it certainly did not prevent the other one from contracting the disease. If prophylactic or curative treatment has been successful, what is the use of spending £25,000 in research on canine distemper?

Anti-abortion vaccine "A" has now been given a good trial and although it is not exactly a specific, I believe it reduces the percentage of abortions and can be recommended to farmers with a certain assurance that abortions will be reduced in the herd. Until we find a specific and make it compulsory to use it, I am afraid we are a long way from eradicating abortion from our herds. The most successful vaccine I use is that for black-leg. The makers allow 1 per cent. of deaths after inoculation, but I think 1·5 per cent. will cover it. The best test as to whether a vaccine is prophylactic or not is in a repeat order, and I have in my practice farmers who have never lost a calf from black-leg since commencing to inoculate.

Of foot-and-mouth disease there is not much to be said, except that we, as practising veterinary surgeons, ought to try to keep away from it as far as possible. If an owner sees any suspicious symptoms and asks our advice, I think we ought to direct him to the police. Nobody would want us about their premises if they knew we had been attending where foot-and-mouth disease existed.

I now propose to say a few words about cow-calving. We, as practising veterinary surgeons in a breeding district, at certain seasons of the year get a great many cases of difficult parturition in cows.

The biggest percentage of cases in the back end of the year are in heifers with their first calf and a circumstance I have noticed in first calvers is that they have generally a very big calf, which fact alone prevents a normal presentation. A leg or a head is missing or a tail presented; and even in the same type of case one has to use different methods of delivery. Take a simple case of two forelegs presented and the head turned back; in some cases one can bring the head round with the first try, in others it can be managed by tying a piece of cord round the lower jaw and pressing the body as far back as possible, when a little traction on the head brings it into position. In others no amount of persuasion will bring the head

into position. I think it is far better, safer, and quicker, when one meets with a case of this kind to take off a foreleg at once. It is quite easy to carry the knife as far along the leg as possible and cut the skin down to the fetlock while some tension is put on the leg with a rope; skin all round the leg as far as possible and then cut the skin round the fetlock. It now takes three good men to pull the leg away, and nine times out of ten the leg comes away clean from the shoulder. If the head still cannot be brought round into position, serve the other leg in the same way; with two legs less in the passage one has more room to work, and the head can generally be brought into position without much trouble and delivery accomplished. I contend that there is less harm done by this method than by working away, inflaming the passage, and better results follow. It is really surprising how much handling a cow can stand and yet do well.

Another type of head malposition is when the neck is twisted and the lower jaw is the first to be felt, with the forehead against the pelvic bones. No amount of traction on the head will take the twist out of the neck. The head has to be grasped between the eyes, forced gently backwards and upwards to the line of the back and brought forward. A good plan, when the head is down below the brim of the pelvis, is to turn your back to the cow in lifting up the head; you get more power to your elbow—it is just like the difference of lifting a weight from the ground and the same weight from your own level.

The hind end of the calf sometimes presents a good deal of difficulty, especially if the tail is presented and the hind legs of a big calf are fully extended. It takes a good long arm to reach below the hocks and bring them up above the brim of the pelvis, and it requires a good deal of care not to pull the point of the hocks through the uterus below the brim of the pelvis. One has generally a fair idea, from the size of the calf and the ease or difficulty one has in pressing it back, whether it is a single one or twins.

About a month ago I had such a case and for the life of me I could not get up the hind legs, although they were the legs of a very small calf. I secured a thin rope and tied it below the hock of one leg, and had a little traction exerted on it, while I guided the point of the hock over the brim of the pelvis, got hold of the shank and pressed it back and presented, and found the joints all joined together. The other leg was brought up by the same method. I still thought there was another calf behind this one, and told the owner so, as the legs were those of a very small calf. We got ropes on the two hind legs and pulled; it was a hard job, because the other half of the calf was a monster. Although perfectly normal, it seemed to me as if the development of the hind quarters had been arrested at about the seventh month. A few of the dorsal vertebræ were missing in front of the sacrum, making it look like a joint.

It was recommended some time ago in the *Veterinary Record*, in cases of breach presentation, that two should work in the cow at the same time, back to back, one pressing the calf forward, while the other lifted up the leg. I find this impossible in an Ayrshire cow, because there is not room enough, but the principle is all right.

There are a good many degrees of twisted uterus, but, as a rule, they are not the worst cases we meet with by any means. When the twist is complete and you cannot get your hand into the uterus, there is nothing to be done but put down the cow and roll over in the same direction as the twist; twice over generally suffices to put matters right. When examining a cow in the standing position, one sometimes comes across a cord stretched right across the passage, and to find the entrance to the uterus one has to turn one's hand down over this cord. The calf may be found in quite a normal position, but impossible of delivery owing to the twist. In this case one has to get hold of a foreleg and swing the calf from side to side and turn it in exactly the opposite direction in which the twist is going. It is a great relief to find the cord has disappeared, and that the calf is exactly in the right position ready for delivery. I think you will agree with me, gentlemen, when I say that the cases in which we have the greatest trouble are monstrosities, and I do not mind admitting the fact that I have been unable to calve a cow more than once. The veterinary surgeon who says he has never been beaten does not calve very many.

It is not in the use of a great many instruments that one becomes an expert obstetrician; in fact, the fewer instruments one uses the better will be the results.

A very useful and instructive discussion followed.

North of Ireland Division.

Dinner to Dr. Bradley.

Under the auspices of the North of Ireland Division a dinner in honour of Professor O. Charnock Bradley, M.D., D.Sc., Ch.B., M.R.C.V.S., Principal of the Royal (Dick) Veterinary College, Edinburgh, was given in Messrs. Thompson's, Donegall Place, Belfast, on Thursday evening, 21st February, 1924. The chair was occupied by the President of the Association, Mr. J. Ewing Johnston, M.B.E., M.R.C.V.S., F.R.S.M. The large company present included, in addition to members of the Association, representatives of the Ulster Medical Society and other public and prominent gentlemen.

After dinner, which was heartily enjoyed, the Chairman said he esteemed it a high privilege to preside at that dinner—and the privilege was greatly enhanced by the importance of the occasion—the occasion being one on which they had the honour of receiving and welcoming their distinguished guest, Professor O. Charnock Bradley, M.D. In their name he offered Dr. Bradley the most cordial of welcomes to the city of Belfast, and he trusted that the pleasure and gratification which they derived from his visit would find so responsive an echo in his heart as would enable him to feel that his stay amongst them, though brief, had not been devoid of both interest and pleasure to himself. Dr. Bradley required no introduction to that meeting. They all knew that he was the gifted Principal of the Royal (Dick) Veterinary College, Edinburgh, and had adorned that high office since the year 1911. He was also Lecturer on Comparative Anatomy in the University of Edinburgh, and was President of the

Royal College of Veterinary Surgeons in 1920-22. He had a very distinguished career and was the author of valuable and valued publications on subjects essential to our fuller education. They also welcomed that day other distinguished guests who took a great interest in their work and whose very helpful services they most gratefully acknowledged. They felt very much complimented by the fact that these gentlemen accepted their invitation and had joined them that evening. They trusted they would do them the further honour of accompanying them to hear Professor Bradley's address, an address which they all knew would be of a most interesting and instructive character. (Applause.)

The toast of "The King" was loyally honoured.

Mr. R. WINN LIVINGSTONE, M.A., Vice-Chancellor of Queen's University, Belfast, submitted the sentiment of "The Medical and Veterinary Professions." He expressed the greatest pleasure and honour in proposing that toast. He hoped they would think it intelligible when he said that that pleasure was enhanced by the fact that the profession was a very ancient one and had a historic descent. There were few toasts that one could more readily rise to propose than that of medicine. There was nobody there who was not indebted in some degree to doctors for the health they enjoyed. It was one of the pleasures in life that, in addition to receiving medical attention from the doctor, they might also know him as a man. But for medicine and medical science the millions who fell in the late war would possibly have been more than doubled. There was no toast, he repeated, that a layman could more readily and heartily propose. Veterinary science at first sight perhaps seemed quite different, but even a layman would realise what magnificent and splendid work was being carried on by that profession. The recent foot-and-mouth disease had cost the country three and a half millions, so even a layman could understand what the veterinary profession could do. There was another point which was noteworthy in connection with this toast. Fifty years ago it would have seemed strange to couple veterinary with medical science. The arts touching the health of human beings and animals had been kept in separate compartments, but now the barrier was being broken down. Comparative anatomy came first and then followed comparative medicine. Doctors had discovered that the two sciences would help each other and had much in common. From experiments and study in connection with the diseases of animals much might be learned about kindred diseases in human beings. In conclusion, he expressed the hope that in the future the two sciences might join together and go hand in hand. (Applause.)

Professor ST. CLAIR SYMMERS, M.B., C.M., who first responded, said he hoped the two professions—medicine and veterinary science—would work in closer conjunction with one another. The sooner they did that the better it would be for each.

Professor CHARNOCK BRADLEY, who followed, was cordially received on rising to reply. He said that many years ago he had expressed the view that the two professions should unite, and in himself he had combined both medical and veterinary science. He was glad that both medical and veterinary professions were joined in the toast. He was also glad to hear the Vice-Chancellor point out that both professions were ancient ones. In one of the oldest laws, which the Vice-Chancellor would know better than he did, it was said that animal life was more valuable than human life. As a matter of fact while they were perfectly convinced that there was only one healing science, yet it must be admitted there were so many divergencies that there must be two branches of that science. It must be clear that if there was one profession there must be two branches. He would rather like to regard the two professions as concentric and, at the same time, touching circles, although that on the face of it might appear a geometrical heresy. It had recently been brought to his notice that neither a medical man nor a veterinary surgeon had in many instances the right to call himself a doctor. The word "doctor" might mean something quite different to the practice of healing power. There were doctors of divinity, doctors of law, doctors of philosophy, etc. It really meant one who teaches. Therefore, it had been suggested that they ought to have some new term which would isolate the medical man from the rest of the heterogeneous mob of doctors. They would claim that whatever new name was coined it would be such as would admit the inclusion of the veterinary surgeon. In prehistoric times a doctor was defined as a leech. He thought, therefore, they might call themselves leeches, but he was not quite sure whether that would be an acceptable term. (Laughter and applause.)

Professor R. J. JOHNSTON, M.P., also replied, and in a few well-chosen words extended a hearty welcome to their distinguished visitor.

Mr. HOWARD M'CONNELL, M.R.C.V.S., proposed the toast of "Our Guests," and in doing so pointed out that while the inspection of meat and milk was excellently carried out in Belfast in the surrounding districts there was a great lack of adequate inspection. In many cases the people had to consume the meat of animals which had been slaughtered to save their lives. (Laughter.) He hoped that when the Minister of Home Affairs, Sir Dawson Bates, brought in the new Public Health Bill in the Northern Parliament he would take this important subject into consideration.

The Minister of Home Affairs, Sir DAWSON BATES, M.P., in responding, expressed his thanks at the honour and privilege of meeting Professor Bradley. Unfortunately, they in Ulster had got no Veterinary College of their own, but they were well served, as he understood that most of the students from the North of Ireland went across to Edinburgh where they were under the very able principalship of Professor Bradley. He felt that though in many ways the veterinary profession was more closely allied to the Department over which the Minister of Agriculture presided than to his own, at the same time it was closely allied to the public health, because without an efficient inspection of the food of the community they could not expect to have an efficient system or administration of public health. He knew there were certain defects in the inspection of the food of the people, but the Government was about to set up a Commission to deal with the whole question of public health, and he hoped that on that Commission they would have the benefit of the services of one of the members of that profession.

(*Continued at foot of next* **page.**)

Notes and News.

The Editor will be glad to receive items of professional interest in these columns

We are pleased to learn that Major Percy Simpson is progressing quite favourably.

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Mr. C. H. Ducksbury, M.R.C.V.S., D.V.S.M., who was recently appointed as Temporary Assistant Veterinary Inspector at Birmingham, has been appointed as successor to Mr. H. L. Torrance at Sheffield. Mr. Ducksbury is the son of Mr. D. A. Ducksbury, M.R.C.V.S., of Lancaster. This appointment creates a vacancy for a temporary veterinary inspector in the Veterinary Department, Corporation of Birmingham. An adverstiement of the post appears on another page of this issue.

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We are very gratified on reading the current number of the *Veterinary Journal* to notice the support which is given to this Association in the first editorial, in regard to State Services and Salaries. The *Journal* in the past has on many occasions called attention to the underpaid positions which are held by veterinarians, and we hope it will continue to do so. In the meanwhile the Appointments Committee of this Association is enquiring into the conditions and the salaries paid in various services at home.

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It has been decided to hold a meeting of the Scottish Branch of the N.V.M.A. at Perth, on June the 7th, under the presidency of W. Wallace Peggie, Esq., F.R.C.V.S. (Biggar). This is welcome news. Branches of the N.V.M.A. do not meet very often, and the Scottish Branch perhaps sets an example to the rest in showing its vitality. The Southern Branch, so far as we are aware, has only held one meeting since its inception. The Northern Branch has held two or three meetings, and has done some useful work in appointing consultants for special subjects.

It is particularly desired to make this Scottish meeting on June 7th a highly successful one. The presidents and secretaries of divisions are meeting to arrange an attractive programme, and all members in Scotland (and elsewhere) should make a note of the date now, and try to so arrange their work as to be able to take a holiday on that day, and go to Perth. Scotland is to lead us this year evidently, and intends to show us folk over the border how to arrange meetings and how to infuse a little enthusiasm into them. We shall have more to say about this branch meeting a little nearer the date.

The Commonwealth Representative.

Captain Ross Grant, B.V.Sc., has arrived from Queensland to represent the Commonwealth as Veterinary Officer in London.

Captain Grant has been in charge of the Meat Export Branch of the Department of Trade and Customs, and his experience has been wide and varied. After passing through the Victorian Agricultural College, he entered the Melbourne University, where he graduated Bachelor in Veterinary Science. Captain Grant served as a veterinary officer during the great war, and on completion of his term of service he toured the United States of America in order to study the latest meat production and inspection methods.

In London he will investigate any complaints relative to Australian meat and study the provision of marketing facilities.

We extend a hearty welcome to Captain Grant, whose address will be High Commissioner's Office, Australia House, Strand, London.

(Continued from previous column.)

He hoped to bring about some redress in the existing conditions of public health. Concluding, Sir Dawson trusted that Professor Bradley would have a pleasant stay in the city.

Colonel W. R. Dawson, M.D., F.R.C.P., also replied, and said that every district, whether urban or rural; had its inspector to deal with the inspection of the food of the people, and this was shown by the reduction in the number of cases of disease in the city. That was due to the combined efforts of the medical and veterinary professions. Long might the Red Cross and Blue Cross ever work side by side, whether in peace or war. He had never heard of animals being slaughtered to save their lives, but he had often been told of pigs being killed to save their bacon. (Laughter.)

Colonel Thomas Sinclair, M.P., proposed the health of the President, and the toast was warmly drunk.

The Chairman, in reply, said that both professions should be as one, especially in research.

Correspondence.

Letters to the Editor should reach the Office not later than by the 1rst post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Street Rights.

To the Editor of the Veterinary Record.

Sir,—I was hoping that the Press would take up the question of the proposed exclusion of horses from the London streets. This is an age of cheek, and no more impudent proposal has hitherto emanated from the great company of one-sided hedge viewers. I would suggest, as a preliminary, that if the proposed exclusion ever comes about, horse owners should resolutely refuse to pay any taxes for the up-keep of the roads, and leave this great pleasure entirely to the owners of mechanically-propelled vehicles, who, even now, do not pay their just proportion of the expense of the up-keep of the roads. When journalists write almost weekly about the perils of the present-day traffic nearly all of them skirt round the edge of the subject; few get to the heart of it. They discuss speed, hooters, signs and signals, the perversity of pedestrians, the idiocy and negligence of drivers, the dangers of cutting in and coming out of side streets at

full speed, and without adequate warning. The plain, unvarnished truth is that the present streets and highways are merely glorified railway tracks, in many cases without any lines, and that quite 25 per cent. of the present-day road traffic ought not to be allowed there at all; it ought to be on the railways. When one adds to this that pedestrians walk in shoals along unprotected paths by the edges of the track, and cross and re cross the road, not all the peddling sophism of intellectual gymnasts will ever make one iota of difference in the number of casualties that will happen. Road legislation is needed nearly as much as housing and unemployment measures, but it is being sadly neglected at the present time. Probably this is because it is primarily a middle-class question.—Yours faithfully, G. MAYALL, M.R.C.V.S.

Bolton.

Thrift.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—One cannot help but admire the spirit that prompted you to write the article on "Thrift" in the issue of the *Veterinary Record* for April 5th. Nevertheless, the outlook of the dissertation will seem to some of us as rather early Victorian. You admire and commend the commercial mind and yet advise young men "to buy nothing for which the ready cash is not available." Now, sir, is not the whole of our commercial system built up on a foundation of supposedly sound *credit*? Commerce to-day would be very paltry if commercial men depended entirely upon available cash for progress. Again you comment adversely on professional men employing qualified accountants to make up their books once a year. I know hundreds of businesses that have gone to the pot where this has not been done. The accountant acts as *auditor*, and should give good and skilled advice. It isn't his place to deal with the daily figures of income and expense, nor does he concern himself much with the detail of daily addition or subtraction. He deals with totals and the figures as a whole. I know of not a few cases in our own profession where practices bought without an accountant's certificate have proved very bad eggs. It is easy for the man who has inherited money or made it easily (by speculation or otherwise) to assume the pontifical attitude. The world to-day was never so full of people who are comfortably or well off but have had a misspent penurious youth and are now incapable of enjoyment (because they never learnt how), a burden to themselves and a model of how not to do it to those who run and read. On all hands there are instances of old men and women run to seed, relics of the Victorian age, who were models of thrift in their youth (if their statements are to be believed), and now they stand out as eminent examples of self-made people badly made, or exemplify the axiom that "it is not want, but abundance, that makes avarice." The foundation of a right life is still a good education (in its fullest sense, intellectually, bodily and from an athletic point of view), and not a consideration of brass and the petty cash point of view as the chief aim.—Yours truly, G. MAYALL.

Bolton.

The Editor begs to acknowledge the receipt of the following:—

Communications from Messrs. N. A. M. MacEwen and C. Watson.

Report of meeting of the North Wales Division from Mr. J. A. Wynne (Hon. Secretary).

Report of the V.M.A. of Ireland, from Professor J. J. O'Connor, Hon. Secretary.

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